

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) Fuel injection system of the common rail type comprising:

a plurality of injectors [(2)], a common channel [(3)] that supplies the fuel under pressure to the injectors [(2)], a high-pressure pump [(4)], which supplies fuel to the common channel [(3)] and is provided with a device [(6)] for regulating the flow rate and a control unit [(7)] capable of keeping the pressure of the fuel within the common channel [(3)], moment by moment, equal to a desired value that generally varies over time;

the control unit [(7)] being coupled to the regulation device [(6)] in order to control the flow rate of the high-pressure pump [(4)] so as to supply the common channel [(3)], moment by moment, with the amount of fuel required in order to have the desired value for pressure inside said common channel [(3)];

the control unit [(7)] comprising a sensor [(11)] that is capable of recording the value for the pressure of the fuel inside the common channel [(3)], and is capable of regulating the flow rate of the high-pressure pump [(4)] by means of a feedback control using as a feedback variable the value for the pressure of the fuel inside the common channel [(3)];

the high-pressure pump [(4)] comprising at least one cylinder [(12)] provided with a piston [(13)] having an alternating motion inside the cylinder [(12)], an intake channel [(14)], a discharge channel [(15)] connected to the common channel [(3)], an intake valve [(16)] coupled to the intake channel [(14)] and capable of allowing a flow of fuel to pass into the cylinder [(12)], and a single-direction delivery valve [(17)] coupled to the discharge channel [(15)] and capable of allowing a flow of fuel only out of the cylinder [(12)];

the regulation device [(6)] being coupled to the intake valve [(16)] in order to keep the intake valve [(16)] open when the piston [(13)] is in a compression phase and therefore to allow fuel to flow back out of the cylinder [(12)] through the intake channel [(14)]; the intake valve [(16)] comprising a valve body [(18)] moveable along the intake channel [(14)] and a

valve seat [(19)] that is capable of being acted upon in a fluid-tight manner by the valve body [(18)] and is arranged at the end of the intake channel [(14)] opposite the end communicating with the cylinder [(12)];

the regulation device [(6)] comprising a control member [(24)] that is coupled to the valve body [(18)] and is moveable between a passive position, in which it allows the valve body [(18)] to act in a fluid-tight manner upon the valve seat [(19)], and an active position, in which it does not allow the valve body [(18)] to act in a fluid-tight manner upon the valve seat [(19)];

the regulation device [(6)] comprising an electromagnetic actuator [(25)] that is coupled the control member [(24)] in order to move said control member [(24)] between the passive position and the active position;

the electromagnetic actuator comprising a spring capable of keeping the control member in the active position, and an electromagnet capable of moving the control member into the passive position;

wherein the force exerted by the spring of the actuator is significantly less than the force exerted by the pressure on the valve body of the intake valve; and

the system (1) being characterised by the fact that wherein the control unit comprises control means for driving the electromagnetic actuator [(25)] ~~is driven~~ by means of a pulse of current of short and constant duration.

2. (Currently Amended) System according to claim 1, in which the intake valve [(16)] is open and the delivery valve [(17)] is closed when the cylinder [(12)] is in an intake phase in order to supply the cylinder [(12)] with a given, constant amount of fuel, while the intake valve [(16)] is closed and the delivery valve [(17)] is open when the cylinder [(12)] is in a delivery phase in order to supply fuel under pressure to the common channel [(3)]; the control unit [(7)] being capable of keeping the intake valve [(16)] open during an initial part of the delivery phase of the cylinder [(12)] in order to discharge through the intake conduit [(14)] the amount of fuel present in the cylinder [(12)] that exceeds the amount of fuel required in order to have the desired value for pressure inside said common channel [(3)].

3. **(Currently Amended)** System according to claim 1, in which the intake valve [(16)] comprises a respective spring [(20)] capable of pushing the valve body [(18)] towards a fluid-tight engaged position of the valve seat [(19)].

4. **(Currently Amended)** System according to claim 1, in which the control member [(24)] is moveable between the active position and the passive position along a linear distance parallel to the direction of flow of the fuel through the intake channel [(14)].

5. **(Canceled)**

6. **(Currently Amended)** System according to claim 1, in which the delivery valve [(17)] comprises a valve body [(21)] moveable along the discharge channel [(15)] and a valve seat [(22)] that is capable of being acted upon in a fluid-tight manner by the valve body [(21)] and is arranged at the end of the discharge channel [(15)] communicating with the cylinder [(12)].

7. **(Currently Amended)** System according to claim 6, in which the delivery valve [(17)] comprises a respective spring [(23)] capable of pushing the valve body [(21)] towards a fluid-tight engaged position of the valve seat [(22)].

8. **(Currently Amended)** System according to claim 1, comprising a low-pressure pump [(8)] capable of supplying the fuel from a tank [(9)] to the high-pressure pump [(4)] by means of a tube [(10)], along which an overpressure valve [(29)] connected to the tank [(9)] is inserted.